

**REPORT OF THE ATLANTIC WHALE  
FISHING GEAR ADVISORY WORKSHOP  
MAY 6-8, 2002 COASTAL INSTITUTE  
NARRAGANSETT, RHODE ISLAND**

**By**

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**I. Background**

During the June 2001 Atlantic Large Whale Take Reduction Team Meeting in Portland Maine, TRT members identified the need to conduct a fishing gear workshop. The workshop would be an opportunity for fishermen and fishing gear experts to convene in a specialized forum with the objective of identifying gear solutions to whale entanglement problems. Responding to this priority, on May 6-8, 2002, the states of Maine, Massachusetts and Rhode Island sponsored an advisory gear workshop that was facilitated by Rhode Island Sea Grant.

**II. Advisory Gear Workshop**

- The purpose of the gear workshop was to discuss and explore ways of modifying existing fishing gear to minimize or eliminate the risk of serious entanglement to right whales. The workshop also sought to identify existing gear configurations that represent low risk of entanglement to whales.

Meeting facilitator Dave Beutel of Rhode Island Sea Grant opened the meeting and welcomed all participants (see list in Appendix 1). He emphasized that all the participants were invited because of their particular expertise and urged everyone to speak openly to assist the group in finding solutions to the entanglement problem.

**III. Description of the Problem: Right Whale and other Large Whale Entanglements, Injuries and Mortalities**

Dr. Scott Kraus, New England Aquarium, (Appendix 2) presented an overview of north Atlantic right whale (nrw) population status and trends in human induced mortalities. Kraus discussed the current status of the population that remains endangered despite nearly 70 years of protection. The population remains at around 300 animals with no detectable growth in the population. Almost half (44%) of the known nrw mortality is due to human activities. From 1970-2001, 54 Right Whale Deaths were recorded. Nineteen of these deaths were from ships (35%), 5 from fishing gear (9%), 15 from unknown causes (28%) and 15 from natural causes (28%).

Though the number of documented fishing gear entanglement deaths appears low, a recent analysis of nrw data indicates there are at least another 10 nrw that have likely died from

entanglements. These include whales that were either clearly injured by an entanglement or have not been re-sighted. Kraus noted many animals simply disappear from the registrar.

Kraus' data indicates that half of right whale entanglements are from *unknown* gear, meaning what's left on the animal is often just a portion of line. Unless the gear can be retrieved and analyzed (for gear characteristics or permit numbers), it is impossible to attribute these gears to a type, sector, state or country of origin. A common type of unidentified gear consists of lengths of line often longer than 150 feet. The *known* gear types that have been identified in entanglements include cod traps, gillnets, drift-nets, hagfish pot, seine and lobster gear.

Workshop discussions following Kraus' presentation included participants' questions regarding the entanglement records and identification and attribution of the gears to individual fishing sectors. Participants briefly discussed the need to assess gear modifications already mandated by the Take Reduction Plan.

Following Kraus' presentation, John Kenney and Glenn Salvador, NMFS Fisheries Engineering, conducted presentations. Kenney provided an analysis of gears involved in large whale entanglements, serious injuries, and mortalities. He also displayed many of the entangling gears that have been taken off large whales since 1997. (Appendix 3)

Glenn Salvador, NMFS Gear Specialist, provided an overview of his research into operational loads exerted on fishing gear and potential modifications of gear to prevent entanglements and/or minimize injury to whales if entangled. His research focused on the operational amount of strain that was placed on gear during hauling as well as towing buoy systems. Load cell research was conducted on gillnet as well as both inshore and offshore lobster fisheries.

Salvador also mentioned research, development and product testing that has been conducted on neutrally buoyant line. This line type is becoming increasingly available with up to eight different companies manufacturing the line. Those who have experimented with neutrally buoyant line discussed their experiences and their opinions of the usefulness of this type of line. While some fishermen reported the line to work well, others reported that some of the manufacturers' early prototypes were too "stiff." The chafing that occurs when any line comes in contact with the substrate was identified as a problem especially for lines fished over rocky habitats and in extreme tides.

The workshop continued with discussions concerning the practical aspects of gear testing and development.

#### **IV. Review of Current Fishing Practices and Configurations**

State fisheries management officials: April Valliere (RI), Terry Stockwell (ME), and Dan McKiernan (MA) presented descriptions of their state fixed gear fisheries and introduced participating fishermen who discussed local fishing strategies, gears and trends.

This discussion was difficult at times due to the emotional and financial strain placed on fishermen by other ongoing fishery management policies and actions. Gillnet fishermen cited the comprehensive court order to protect groundfish and the unexpected closure of the monkfish fishery as devastating decisions that will bankrupt many New England fishermen including some of the workshop participants. Furthermore, the Federal Dynamic Area Closures were expected to cause severe and unprecedented disruption to the fixed gear businesses. A common concern among many of the lobster fishermen was the consequent - and uncontrolled - growth in the lobster fishery from displaced groundfish fishermen. The number of traps and lines in the water will undoubtedly be increased when fishermen divert their time, resources and energy into lobster trap fishing.

## **A. Fishery Descriptions and Trends**

### **Rhode Island**

April Valliere discussed the status of the Rhode Island fixed gear fisheries and introduced the RI fishermen in attendance. The lobster industry is one of RI's most vital commercial fisheries, employing more than 2,000 fishermen in the inshore and offshore fisheries, landing an average of more than five million pounds of lobster with an average ex-vessel value of twenty million dollars (\$20 million) annually. The lobster fishery has 1,500 permits of which only 350 are actively fished, posing a potential latent effort problem.

There are 375 commercial licenses issued for gillnetting by RIDEM. However, only a small fraction of those licenses are currently active. The RI gillnet fleet consists of approximately 20 vessels, all under 50' in length. Most of the gillnet fleet is part-time, switching to lobster fishing seasonally. The primary target species by gillnetters are monkfish and dogfish; supplemented by seasonal codfish, flounder and tautog gillnetting. Due to stringent regulations on dogfish and monkfish, the directed gillnet fishery effort continues to decline, and it is anticipated that many gillnet vessels will re-direct effort into the lobster fishery.

Participating fishermen described their fishing styles and configurations. One gillnetter noted that in light of the results from the load cell experiments conducted in southern New England, breaking strengths on surface buoy systems could be reduced safely. However, an offshore fisherman expressed concern about lowering the breaking strengths on offshore gear surface systems because tuna vessels often tie onto the high-flyer systems to anchor their vessels. This results in lost high-flyers and the problem would be exacerbated if the breaking strengths were lowered.

A lobsterman reported that most fishermen who fish multiple pot-trawls inshore in RI Sound already deploy sinking line to reduce the gear conflicts among lobstermen. He reported that the amount of gear is so dense in his area that using floating groundlines would increase snarls between trawls.

Discussion shifted to a lack of enforcement and the consequent low levels of compliance. One participant complained that fishermen breaking the gear modification regulations are making money while the compliant and honest fishermen are losing out. He speculated that there is 80% non-compliance.

### **Maine**

Terry Stockwell introduced the participating fishermen from Maine and described trends in the Maine fixed gear fisheries. He noted that Maine is seeing a groundfish industry in decline, and reported that many of these fishermen have recently joined the ranks of lobstermen. This effort, combined with recent record high landings, has greatly increased the amount of lobster fishing effort in the past few years. The State of Maine currently permits approximately 7,000 lobstermen and sells close to three million trap tags. Out of these numbers there are around 1,100 federal permitted lobstermen as well. It is a healthy fishery that drives a resource dependent coastal economy.

The participating fishermen represented three geographically diverse sections of the state. Each described their fishing styles and configurations. The "typical" lobster gear configuration is quite dissimilar: Maine lobster fishermen use every type of gear configuration: singles, pairs

triples, and trawls up to 50 pots. One fisherman stated he fishes singles, doubles and triples, but in many areas he has to fish singles because the bottom is extremely saturated with gear. He stated that after a recent storm there was a "snarl" that contained 150 single traps.

The fishermen highlighted that the Maine coast features exceptionally rocky substrates and the strongest tidal currents in the Northeast U.S. Almost all fishermen use floating line (polypropylene, poly ) on both their horizontal groundlines (connecting traps) and the lower third-half of their buoy lines due to problems posed by tide, weather, and chafing problems found with other lines. Fishermen further rely on heavy weights such as concrete and railroad ties to hold down their gear in the areas of strong tidal currents.

In light of the desire to reduce breaking strengths and line profiles, discussion shifted to the extreme fishing conditions of eastern-most Maine, especially the Grand Manan Channel. One fisherman who fishes there described the challenges of fishing in this habitat: He fishes in 300-ft. depths in tidal currents up to 5.8 knots. He needs to fish poly-balls as marker buoys due to the problem of submerging buoys - even these floats will submerge at certain tidal stages. These conditions require gear that is stronger than what is fished in the more southern areas. His ground lines are 1/2" polypropylene. He also noted there appeared to be a large increase in fishing effort (traps) in the past few years with a near three-fold increase.

Maine gillnet effort is presently very low. Due to the many Federal regulations, trip limits and poor catches, the inshore fleet have disappeared. The offshore fleet has also significantly declined. There are currently less than 15 vessels actively fishing. The Department of Marine Resources believes that every ground fish fishermen, who is also permitted to fish for lobster, has already made the transition. Other fixed gear effort includes: winter shrimp trap fishery; red crab, mixed crabs, and hagfish. There is also an increasing interest in fish traps and a pending jonah crab EFP. The EFP will permit 100 lobstermen to fish 200 additional traps. The permit will require this gear to be rigged with the existing federal whale compliant measures and for the permittee to be network trained under the Maine Take Reduction Plan

Discussion shifted to levels of industry compliance and enforcement. There were mixed reports on whale gear compliance and associated enforcement throughout out Maine. Stockwell reported that the Maine Marine Patrol had recently signed a Joint Law Enforcement Agreement with NMFS. All Marine Patrol Officers are now Federally Deputized, and enforcement of whale gear compliance will be part of a boarding officer's protocols. The fishermen expressed support for the new Maine Take Reduction Plan, which underscores the State's attempt to equally protect both the whales and the fishermen.

## Massachusetts

Dan McKiernan described the fisheries in Massachusetts and introduced the participating fishermen. He noted that the state has taken a formal position on restrictions pertaining to floating groundlines as part of the settlement agreement in the federal court case. In Cape Cod Bay by 2004, floating groundline will be banned year-round.

DMF's Bill Hoffman presented a quantitative treatment of gear configurations within Massachusetts based on interviews of randomly selected fishermen. These gear summaries covered hagfish pots, longline, gillnet, lobster, and fish pots. (Appendix 4)

One Massachusetts gillnetter was critical of the groundfish negotiations and the Large Whale Take Reduction Plan rules that failed to secure fishing opportunities for fishermen willing to tend their nets, and bring them home at the end of each trip.

As in the other NE states, the inshore gillnet fishery is in decline due to the regulations to conserve groundfish (i.e. Rolling Closures), but also spiny dogfish and harbor porpoise

restrictions as well. Increased lobster fishing effort is expected as fishermen are displaced from groundfish fisheries.

The participating fishermen described their fishing styles and configurations, noting that most fishermen are no longer purchasing new "poly" and are phasing it out. The sinking line and neutrally buoyant lines seem to be acceptable on mud, sand, or gravel substrates.

## **B. Existing Short-term Risk Reduction Methods**

Workshop participants identified a number of gear modifications and devices available now that could be implemented to reduce whale entanglements. These modifications are as follows:

### **Weak links and their placement**

Glenn Salvador provided an overview of varying gear configurations and weak links generated by his and others' gear research. A fisherman questioned the higher breakaway strengths required by the Plan in the offshore fishery versus the inshore fishery when whales of the same strength move into both regions. Salvador replied that the regulations considered a "safe operational working load" for fishermen. Industry emphasized that safety issues must also be considered.

Discussion shifted to the current gear regulations and the actual placement of weak links. The workshop participants identified a number of different gear configurations that currently utilize flotation devices in multiple locations on the endlines. In an effort to further reduce risk of serious injury and or mortality from and entanglement with an endline, after much deliberation the group recommended the placement of a weak link on all flotation devices.

An offshore lobster representative noted that they use a weak link both at the high-flyer as well as at the float ("poly-ball"). At the high-flyer they use a 1,500 lb. breakaway and they deploy a stronger weak link (3,780 lb.) at the float. Discussion followed and the workshop participants further recommended multiple weak link breaking strengths within the water column; the higher you are on the buoy line, the weaker the link should be. (Diagram 1)

Two new weak link devices were discussed in depth. The first was Eric deDoes' gillnet float that won the 2001 Eubalaena Award for innovative gears. This device will allow the head rope on gillnets to separate when a 1,100 lb. load is encountered, therefore, allowing a whale to break free. The device is expected to be available in commercial quantities soon. DeDoes demonstrated the prototype (see Appendix 5). The second was Gary Ostrom's sliplink, (Appendix 5) a plastic device that houses a loop of line designed to release at specific breaking strengths (e.g. 490 lb.) This device has been re-designed to accommodate 3/8" line. The previous version of this device accommodated only 5/16" line.

Participants also discussed practical issues and incentives for modifying gears. Participants were concerned that what gear modifications they make today could be made obsolete by new government regulation tomorrow. Many fishermen agreed that closing a fishery does not provide fishermen with an incentive to create new gear modifications. Fishermen noted their concerns regarding the cost and time associated with gear modifications and requested that financial incentives (e.g. buy-backs, grants etc.) be made available to assist fishermen in modifying their gear. Enforcement was once again identified as a primary component of compliance.

## Neutrally Buoyant Line

Dan McKiernan presented a short video comparing the underwater profiles of sinking, neutral and floating groundlines associated with lobster trawls. The study, conducted in lower Cape Cod Bay, was funded by NMFS and used SCUBA divers to measure and videotape gear profiles of floating line in contrast with neutrally and negatively buoyant line products. The video documented the arc created by the floating line, the height of the gangions off the traps, main lines, and groundline behaviors.

The study concluded that that all the so-called neutrally buoyant line were negatively buoyant products (registering a specific gravity greater than seawater) and in contact with the substrate. In contrast, the trawls with floating groundlines featured elevated mainlines that were no lower than 5 feet above the ocean floor and the arcs between gangions rose to 16 feet high on average.

Salvador noted that there are up to 8 cordage companies manufacturing neutrally buoyant line. Fishermen questioned the lines operational usefulness especially on rocky bottoms where the line may become wrapped around rocks. They also argued that before a rope or any other product can be determined effective and durable, it needs to be fished for a year or longer in the water. Ben Brickett, gear technology expert, mentioned that the Navy has done work on chafing line for their undersea fiber optic devices and suggested contacting the Navy for more information.

Completing the discussions, a fisherman raised the issue of varying ambient pressures on fishing line at varying depths. The fisherman questioned whether temperature, depth and pressure would affect the arc of line. Fishermen discussed methods to stretch the gear and reduce arcs created in fishing line.

## **C. Continuing Gear Research to Reduce Risk**

Workshop participants identified a number of gear modifications and devices that would require additional research and development. These modifications are as follows:

Brickett discussed his prototype device, "timed controlled cutter". This device is meant to detect the pulling of line by an entangled whale. The device can be placed on 5/8 or 3/4 line and is reusable (lasting from 5-10 years). A pulling load weight and length of pulling on fishing line can be pre-set on the cutting device. After continuous pulling occurs at a predetermined strength, the device makes a clean cut/break in the rope, therefore allowing an entangled whale to free itself. (Appendix 5)

Cliff Goudey discussed his low profile or whale safe buoy design. The device is a prototype replacement for the conventional buoy. It is comprised of a long flexible stem that provides a gradual transition from the buoy line. The concept is to create more buoy flexibility from the endline to the rigid and buoyant portion of the buoy. By eliminating this intersection, the low profile buoy is able to slide free of most encounters with whales or other snagging objects. (Appendix 5)

## **D. Potential Long-term Projects to Reduce Risk**

John Kenney discussed a potential breakaway design called mechanical disabled bottom weak like system. (Appendix 5) This device would be a weak link in its natural position but through a mechanism made stronger by the fishermen at hauling time. Kenney recommended that this device be investigated in a future research funded project if funds are made available. Kenney also presented the concept of research into an acoustically enabled weak link system. The concept is to deploy a weak endline system that can acoustically enable a strengthening device that will allow the gear to be hauled at full strength. There was little discussion on this concept as the workshop members were skeptical of any research concerning acoustic device systems.

## **E. Workshop Research Recommendations**

Workshop participants researched consensus on the following research items.

These items include: (listed in order of priority)

### Reduction of groundline arc profiles

Fully investigate all line profiles in whale habitats, particularly groundlines in rocky and tidal areas. This research was identified as the highest priority.

Identify area specific solutions and the techniques needed to allow the existing floating line to continue to be used but with a lower profile. This includes weighing down the lines with heavier materials. Participants discussed methods to reduce the arcs in the line created between traps; this might include attaching weights or ("sistering") heavier line (i.e. leadline) to the mainline at certain intervals.

### Investigation into the utility and problems associated with the use of neutral and sinking line in rocky habitats.

This includes the development of abrasion resistant lines.

### Development of a mechanical line splicer

This device would negate many of the knots that are a current feature of vertical lines. This type of device would eliminate the need to hold lines together by knotting and instead join two pieces of line together through a device or splice that could be separated. (i.e. Chinese fingers) (Appendix 5)

### Flat link bottom breakaway

The breakaway would be a type of weak link. This device would be located at the end of the buoy line for single lobster traps and at the point where the buoy line meetings the groundline for lobster trawls. (Appendix 5)

### Research the potential for lipid-soluble lines

This type of line would degrade if embedded in whale flesh.

### Research the effect of colored line on whale behaviors

This research would investigate whale eyesight and their ability to avoid certain colored lines. The color of fishing line could then be altered in accordance with the findings.

### Research the use of reflective material on line

This research would investigate whale eyesight and their ability to avoid reflective material. The reflective properties of fishing line could then be altered in accordance with the findings.

No further research concerning acoustic devices that would remove surface markers. Industry fully rejected any further discussion concerning the concept of eliminating vertical lines that mark at the surface the location of fixed gear ends.

## **F. Take Reduction Plan Recommendations**

Throughout the workshop, fishermen and state regulators discussed some of the existing Take Reduction Plan regulations, current as well as potential risk reduction methods and strategies that are problematic.

Participants strongly recommended the following:

1. End to the Dynamic Area Management (DAM) approach to managing fisheries. Fishermen and state regulators agreed that last minute management closures, responding to small aggregations of whales provides minimal conservation while being highly disruptive and costly to the industry. The cost to government agencies for administration and enforcement is substantial, but without adequate enforcement, non-compliance is expected to be a problem. Fishermen lack the ability to remove gear out of an area in short time periods and the net result is a displacement of effort to the edges of the closed area.
2. Repeal of certain gear requirements for the Seasonal Area Management Regulations (SAM). Specifically, the group opposed the elimination of one buoy line and the prohibition on floating line at the bottom of the buoy line.
3. Rejection of eliminating vertical lines that mark at the surface the location of fixed gear ends. If the location of the gear is unknown, gear conflicts and losses would be rampant. Participants were also skeptical that devices required to trigger release of the buoy systems (i.e. acoustic release) would be expensive and unreliable. Furthermore, state and Federal regulations require marking of fixed gear as does the Responsible Fishing Codes of Conduct.
4. Reduce the risk posed by floating groundline. Research the extent of the problem in habitats and create area specific solutions to reduce these profiles.
5. Weak links should be deployed on all floatation devices.
6. Opposed mandates to modify gear on short notice. It is unreasonable to expect fishermen to purchase replacement gears on short notice. Gears are often unavailable and without financial support, the one-time costs can be devastating to any small owner/operator of a fishing business. Fishermen should be allowed to replace gear inventories over time.
7. Rules should be made more consistent where possible. There are needless discrepancies for fishing in various right whale high-use areas. Specifically, the rules for Cape Cod Bay and Great South Channel Critical Habitats, SAM Areas, and DAM Areas should be made more consistent.
8. Industry was opposed to universal gear modifications. Gear restrictions outside of Critical Habitats and other high-risk areas need to be flexible and accommodate the needs of the industry. Management needs to consider that New England gear types, fishing conditions,

fishing habitats and fisheries are variable and diverse in areas outside of identified critical habitats.

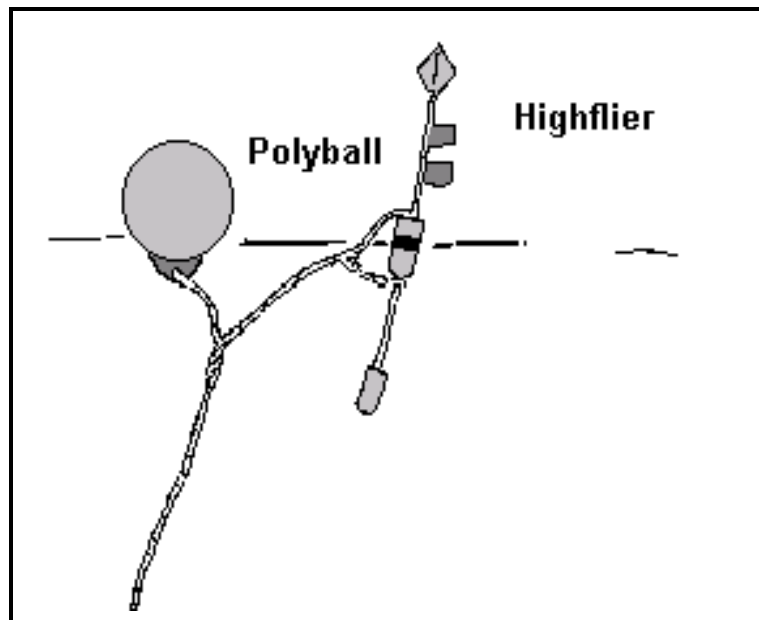
9. Whale related rules should include all fixed gear fisheries. Presently, only lobster pot/trap and gillnet fishermen are affected by regulations while fishermen using similar fixed gear configurations are not. This inconsistency should be rectified. (FYI Trap fisheries capable of catching lobster are also included in the Federal Register language, such as red crab pots)
10. Participants discussed the need for industry wide financial assistance in order for industry members to purchase mandated gears types (lines, breakaways) to reduce risk whale entanglements. A "buy-back" program was the most popular option discussed. Such a program would remove the gear from the fishery for eventual recycling or disposal. In addition, there should be a phase in period for replacement line.

## **V. Conclusion**

The timing of the workshop coincided with a difficult time for the fishing industry, in particular for the gillnet participants facing considerable hardships due to the recent regulations placed on their industry fisheries. Despite the regulatory drawbacks, all industry participants provided vital input on gear problems and potential solutions to a very difficult problem. The consensus shared at the completion of the meeting was that the gear workshop was an extremely valuable process. The workshop not only created an environment where fishermen felt at ease and spoke openly but also created a forum where fishermen were able to develop relationships with other fixed gear fishermen from neighboring states. Workshop participants described the workshop as eye-opening and a good opportunity to learn from each other as well as gear experts, managers, and regulators that were present. Lastly, participants advised that the workshop discussions and recommendations be favorably considered in a timely manner and that this type of a pro-active forum be used during all future fishing gear related rule making processes.

### Diagram 1

Weak links placed at high-flyer, float ("poly-ball"), and other possible flotation devices that may be used on the endline. These multiple weak links would have varying breaking strengths within the water column; the higher you are on the buoy line, the weaker the link should be.



## **APPENDICES**

**Appendix 1: Workshop Agenda and List of Participants**

**Appendix 2: Scott Kraus , New England Aquarium, Presentation**

**Appendix 3: Summary of John Kenney and Glenn Salvador s, NMFS, Analysis of Gears Involved with Right Whale Entanglements**  
(For the report in its entirety please contact NMFS Protected Resource Division, Northeast Region One, Blackburn Drive Gloucester, MA 01930-2298 (978) 281-9328.)

**Appendix 4: Massachusetts Division of Marine Fisheries Fixed Gear Characteristic Survey**

**Appendix 5: Gear Descriptions**

## **Appendix 5: Gear Descriptions**

### **Gillnet Breakaway Float**

Designed by Eric deDoes of Plant's Lobster Escape Vents, Inc. a gillnet breakaway float will allow the head rope on gillnets to separate when a 1,100 lb. load is encountered, therefore, allowing a whale to surface.



The float consists of two float halves, four rope-retaining clips and four screws. After inserting the retaining clips in the float halves one half is placed on the float line. The second is then installed and the four screws are used to hold the float together. The last step is to cut the float line through the provided slot in the float. Once installed, the float line will release from the float when 1,100lb.load is encountered.



The breakaway float can be used on new as well as used nets. The device can be adjusted to account for various breaking strengths and for various sized float lines. The concept of this piece is currently being designed for the lobster buoy lines. Use of this new device will allow the lobster buoy line to release with no knot or not to increase in diameter. This device is believed to be beneficial in reducing right whale baleen entanglements.

### **Mechanically Disabled Bottom Weak Links System**

John Kenney of the National Marine Fisheries Service presented the concept of this device that has not yet been developed. This device would be placed at the bottom of a buoy line. It would operate at a selected bottom weak link amount until an acoustic signal was received from the surface. This signal would deactivate the weak link and allow the gear to be hauled in a normal fashion.

### **Galvanic Time Release (GTR) Disabled Bottom Weak Link**

John Kenney of the National Marine Fisheries Service presented the concept of this device that has not yet been developed. This device would also be placed at the bottom of a buoy line. It would operate at a specified bottom weak link amount while the GTR was intact. When the GTR releases, it would defeat the weak link allowing the gear to be hauled in a normal fashion. Reliable GTR devices are available to provide trigger times of hours, days or weeks. An additional degree of safety could be incorporated into the device such that it would return to its weak link state after a predetermined time period.

### **Mechanical Line Splicer**

Workshop participants proposed the development of a mechanical line splicer. The concept of this device was mentioned as a possible method to eliminate knots in fishing lines. This type of device would eliminate the need to hold lines together by knotting and instead join two pieces of line together through a device or splice that could be separated.

### **Flat Link Bottom Breakaway**

Workshop participants proposed the development of a flat link bottom breakaway device to be used for lobster singles or trawls. The breakaway would be a type of weak link located at the end of the buoy line for single lobster traps and at the point where the buoy line meetings the groundline for lobster trawls.

### **Low Profile Buoy (Whale Free Buoy)**

Cliff Goudey's device is a replacement for the conventional buoy. The low profile buoy or whale-free buoy comprises of a long flexible stem. The long buoy stem provides gradual transition from the buoy line. This creates more buoy flexibility from then line to the rigid, buoyant portion of the buoy. Current buoys have an abrupt intersection between the line and buoy stick. By eliminating this intersection, the low profile buoy is able to slide free of most encounters with whales or other snagging objects. The tapered shape of the buoy may also facilitate its passing though the baleen of a whale if the entanglement is within the mouth.

The buoy has been designed through support from the

Northeast Consortium and the Center for Fisheries Engineering Research (CFER). A manufacturer will develop the tooling needed to produce flexible, inflatable prototypes. Commercial trials of 100 buoys will be conducted in collaboration with six Maine and Massachusetts lobstermen. If successful, the Whale-free buoy may offer a significant reduction in the risk of whale entanglement in buoy lines of commercial fishing gear.

### **Sliplink**

Gary Ostrom, Cape Cod fisherman, has designed and tested this device for the past three years. The device was developed to comply with both Massachusetts and federal right whale requirements to deploy a knotless buoy system with a workable breakaway strength of under 600 lb. in federal waters and 500 lb. in state waters. The device has been designed for 5/16 line. However, through the assistance of New Hampshire Sea Grant personnel, a grant has been provided to produce a sliplink mold to accommodate 3/8 line.

While using sliplink Ostrom has found that the bitter end of line acts as a clutch and continues to slip and grab a number of times before finally releasing the buoy. Ostrom recommends fishermen place the sliplink approximately 10 to 12 from the bitter end. This placement will allow a fisherman approximately eight tries during his haul before the sliplink releases, allowing the buoy to become disentangled from the knotless line end. Sliplinks are reusable and are designed to reduce right whale baleen entanglements that are associated with knots in fishing lines. Workshop participants suggested this device be tested in fishing grounds other than Cape Cod Bay.

The Modern Mould Sliplink can be seen on the NOAA Fisheries techniques for making weak links and marking buoy lines.

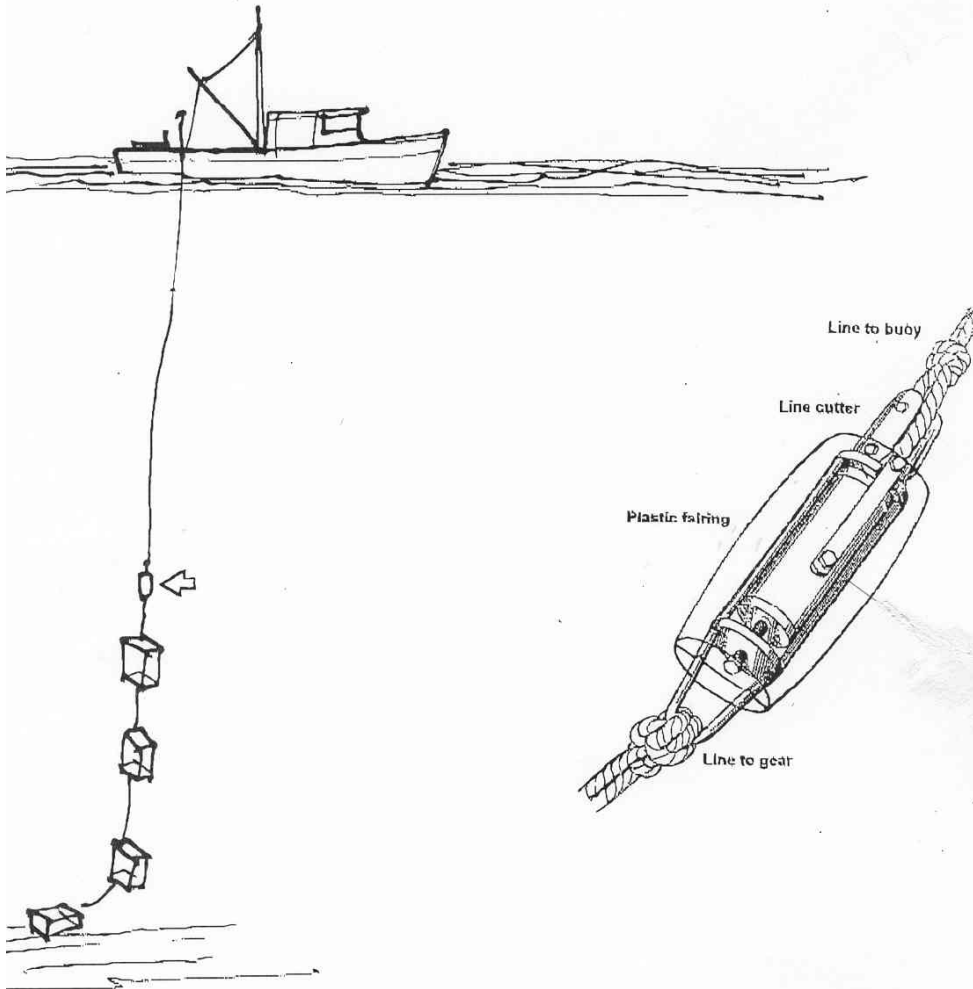
### **Time Controlled Cutter**

Ben Brickett's time controlled cutter is a time/tension sensitive line cutting apparatus that would be placed on the end of a buoy line. The device is not a weak link. Fishermen would be able to haul their gear at full strength for the duration of the haul without severing the line. However, pulling on the line does activate the pre-settable cutter. After the pre-set time/tension is exceeded, the buoy line at the gear end is cleanly cut leaving a knot free end and releasing the whale from the bottom gear. The whale can swim free with the surface buoy providing drag to facilitate disentanglement from the severed line. If the continuous tension occurring is a fisherman having difficulty hauling the gear, the gear can be left for a period of time to prevent the cutter from severing the line. The device is able to reset itself and allow a fisherman to continue hauling after a period of time without losing his gear.

Time controlled cutter picture as seen below:

### How the *device* helps the fisherman....

It enables the gear to be hauled up in the normal fashion. It is not a weak link.



The time/tension feature of the *device* enables the fishermen to haul up their gear at full strength for the duration of the haul without severing the rope.